Remarks

The Applicants respectfully request reconsideration in view of the foregoing amendments and following remarks.

I.   Amendments to the Specification

The Applicants have amended the specification to update references to related applications.

II.   Amendments to the Claims

The Applicants have amended the claims to focus on using variable length codes in joint coding (or corresponding decoding) of motion vector information (or, motion information) with a terminal symbol and/or information indicating whether a set of pixels is intra-coded. *See, e.g.*, application at 19-21, 23-25, and 38-40 as well as original claims 15, 16 and 67.

The Applicants have canceled claims 13-47, 61-63, 67 and 68 without prejudice.

III.   Claims 1-3, 5-8, 10-12, 48, 51-60, 64, 69-71 and 73-77 Should Be Allowable

In the Office action dated May 5, 2008 ("Office action"), the Examiner rejects claims 1-3, 5-8, 10-16, 48, 51-61, 63, 64, 67-71 and 73-77 under 35 U.S.C. § 102(b) as being unpatentable over U.S. Patent No. 5,227,878 to Puri et al. ("Puri patent"). The Applicants respectfully disagree.

A.   Puri Patent

In the interest of reaching a shared understanding of the disclosure of the Puri patent, the Applicants make the following observations

The Puri patent describes video compression with a "coding type signal." Puri patent, Abstract. Motion vectors are produced as part of the video compression, and motion vector components are encoded differentially with respect to previously transmitted components. Puri patent, 12:10-16; 12:37-39; Figure 1A. The differential motion vector components are sent to an encoder and multiplexer and then to a buffer for insertion into an output bit stream. Puri patent, 12:54-56; Figure 1A; 63:1-65:67 ("mv_send"); 80:1-81:67 ("mv_send"). A corresponding

decoder receives the differential motion vector components and uses them in reconstruction of video images. Puri patent, 12:56-59; 15:11-22.

As part of the compression, a block type classification circuit 44 receives an inter/intra type signal which identifies whether inter-coding or intra-coding is used for a given block. Puri patent, 12:65-13:25; Figure 1A. The intra/inter coding type signal controls various switching elements in the compression. *Id.* "The inter/intra coding type signal is also part of the block classification signal sent to the encoder and multiplexer 24." Puri patent, 13:26-28. Then, the block classification signal "is transmitted to the buffer 25 by the encoder and multiplexer for insertion into the output bit stream." Puri patent, 13:29-31. A corresponding decoder receives the block classification signal and uses it in reconstruction of video images. Puri patent, 13:31-34; 15:1-10. Elsewhere, the Puri patent describes a macroblock_type syntax element, which can indicate whether a macroblock is intra-coded, and which is signaled at macroblock level. Puri patent, 28:3; 28:8; 28:19 and 28:43-29:6.

The Puri patent also indicates that, "In P- and B-pictures, some macroblocks may contain no coded coefficient data. A one-bit flag is sent for each macroblock to signal whether the macroblock is coded or not." Puri patent, 7:59-62. The example syntax of the Puri patent includes a one-bit syntax element macroblock_code_nocode at macroblock level for a predictive-coded macroblock or bidirectionally predictive-code macroblock. Puri patent, 28:11; 28:24.

In summary, the Puri patent describes (a) a block classification signal that includes an inter/intra coding type signal, (b) differential motion vector components and (c) a one-bit macroblock_code_nocode flag, but these elements are separately sent to an encoder and multiplexer for transmission as different syntax elements in an output bit stream.

B. **Claim 1**

Claim 1, as amended, recites:

> jointly coding the value for the switch code with motion vector
> information for the set of pixels, wherein a single variable length code represents
> the value for the switch code and the motion vector information, the single
> variable length code being selected from a table of different value combinations
> for the switch code and the motion vector information.

According to claim 1, an encoder encodes a set of pixels (e.g., a block, a macroblock). As part of the encoding, the encoder determines a value for a switch code. The value for the switch code indicates whether the set of pixels is intra-coded. The encoder jointly codes the values for the switch code with motion vector information (e.g., differential motion vector information) for the set of pixels. A single variable length code represents the value for the switch code and the motion vector information, where the single variable length code is selected from a table of different value combinations for the switch code and the motion vector information. For example, the table has different values combinations for <intra, MVx, MVy>, or it has different values combinations for <intra, MVx, MVy , last>. *See, e.g.*, application at 24-25 and 38-40. The encoder outputs the single variable length code in a bit stream.

The Puri patent fails to teach or suggest the above-cited language of claim 1. According to the Puri patent, video compression uses a block classification signal (which includes an inter/intra coding type signal) and differential motion vector components. *See* above, section III.A. The block classification signal and differential motion vector components are separately encoded and output in a bit stream. *Id.* Even if, for the sake of argument:

(a) an inter/intra coding type signal (as in the Puri patent) qualifies as a switch code (as in claim 1), and

(b) differential motion vector components (as in the Puri patent) qualify as motion vector information (as in claim 1),

the Puri patent describes separately encoding such information and using separate codes in an output bit stream. *Id.* This is different than, and leads away from, "jointly coding the value for the switch code with motion vector information for the set of pixels" as recited in claim 1. It is even further from teaching or suggesting performing the joint coding such that "a single variable length code represents the value for the switch code and the motion vector information, the single variable length code being selected from a table of different value combinations for the switch code and the motion vector information," as recited in claim 1.

For at least these reasons, independent claim 1 should be allowable. Such action is respectfully requested.

C.   Claims 5 and 70

Claim 5, as amended, recites:

jointly coding the value for the switch code with motion vector
information for the set of pixels and with a terminal symbol indicating whether
transform coefficient data is encoded for the set of pixels, wherein the jointly
coding yields an extended motion vector code that is a single variable length code
representing (a) the value for the switch code, (b) the motion vector information
and (c) the terminal symbol, the single variable length code being selected from a
table of different value combinations for the switch code, the motion vector
information and the terminal symbol.

Claim 70, as amended, recites:

means for encoding an extended motion vector code for a set of pixels,
wherein the extended motion vector code reflects joint encoding of motion
information together with intra/inter decision information indicating whether the
set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the
terminal symbol indicates whether subsequent data for the set of pixels is included
in the encoded bit stream, and wherein the extended motion vector code is a
single variable length code representing (a) the intra/inter decision information,
(b) the motion information and (c) the terminal symbol, the single variable length
code being selected from a table of different value combinations for the intra/inter
decision information, the motion information and the terminal symbol.

The Puri patent fails to teach or suggest the above-cited language of claims 5 and 70,

respectively. According to the Puri patent, video compression uses a block classification signal

(which includes an inter/intra coding type signal), differential motion vector components and a

one-bit macroblock_code_nocode flag. *See* above, section III.A. The block classification signal,

differential motion vector components and macroblock_code_nocode flag are separately encoded

and output in a bit stream. *Id.* Even if, for the sake of argument:

(a) an inter/intra coding type signal (as in the Puri patent) qualifies as a switch code (as in
claim 5) and qualifies as intra/inter decision information (as in claim 70),

(b) differential motion vector components (as in the Puri patent) qualify as motion vector
information (as in claim 5) and qualify as motion information (as in claim 70), and

(c) a macroblock_code_nocode flag (as in the Puri patent) qualifies as a terminal symbol
(as in claims 5 and 70, respectively),

the Puri patent describes separately encoding such information and using separate codes in an

output bit stream. *Id.* This is different than, and leads away from the "joint coding" language of

claim 5 and "joint encoding" language of claim 70. It is even further from teaching or

suggesting performing joint coding with a single variable length code representing "(a) the value

for the switch code, (b) the motion vector information and (c) the terminal symbol, the single variable length code being selected from a table of different value combinations for the switch code, the motion vector information and the terminal symbol" (claim 5), or performing the joint encoding with a single variable length code representing "(a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, the single variable length code being selected from a table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol" (claim 70).

For at least these reasons, independent claims 5 and 70 should be allowable. Such action is respectfully requested.

D.   Claims 48, 69 and 71

Claim 48, as amended, recites:

decoding an extended motion vector code for the set of pixels, wherein the extended motion vector code reflects joint encoding of motion information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, and wherein the decoding the extended motion vector code uses a table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol.

Claim 69, as amended, recites:

means for decoding an extended motion vector code for a set of pixels, wherein the extended motion vector code reflects joint encoding of motion information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter decision information, (b) the motion information and (c) the terminal symbol, and wherein the decoding the extended motion vector code uses a table of different value combinations for the intra/inter decision information, the motion information and the terminal symbol.

Claim 71, as amended, recites:

decoding an extended motion vector code for the set of pixels, wherein the extended motion vector code reflects joint encoding of motion vector information together with intra/inter decision information indicating whether the set of pixels is intra-coded or inter-coded and with a terminal symbol, wherein the extended motion vector code is a single variable length code representing (a) the intra/inter

decision information, (b) the motion vector information and (c) the terminal
symbol, and wherein the decoding the extended motion vector code uses a table of
different value combinations for the intra/inter decision information, the motion
vector information and the terminal symbol.

The Puri patent fails to teach or suggest the above-cited language of claims 48, 69 and 71,
respectively. According to the Puri patent, video compression uses a block classification signal
(which includes an inter/intra coding type signal), differential motion vector components and a
one-bit macroblock_code_nocode flag. *See* above, section III.A. The block classification signal,
differential motion vector components and macroblock_code_nocode flag are separately encoded
and output in a bit stream. *Id.* A corresponding decoder receives and uses the block
classification signal, differential motion vector components and macroblock_code_nocode flag.
Even if, for the sake of argument:

    (a) an inter/intra coding type signal (as in the Puri patent) qualifies as intra/inter decision
        information (as in claim 48, 69 and 71, respectively),

    (b) differential motion vector components (as in the Puri patent) qualify as motion
        information (as in claims 48 and 69, respectively) and qualify as motion vector
        information (as in claim 71), and

    (c) a macroblock_code_nocode flag (as in the Puri patent) qualifies as a terminal symbol
        (as in claims 48, 69 and 71, respectively);

the Puri patent describes separately encoding such information and using separate codes in an
output bit stream. This is different than, and leads away from decoding a code that reflects "joint
encoding" as recited in claims 48, 69 and 71, respectively. It is even further from teaching or
suggesting decoding a single variable length code that represents "(a) the intra/inter decision
information, (b) the motion information and (c) the terminal symbol," wherein the decoding
"uses a table of different value combinations for the intra/inter decision information, the motion
information and the terminal symbol" (claims 48 and 69, respectively), or decoding a single
variable length code that represents "(a) the intra/inter decision information, (b) the motion
vector information and (c) the terminal symbol," where the decoding "uses a table of different
value combinations for the intra/inter decision information, the motion vector information and
the terminal symbol" (claim 71).

For at least these reasons, independent claims 48, 69 and 71 should be allowable. Such action is respectfully requested.

E.   Claims 2, 3, 6-8, 10-12, 51-60, 64 and 73-77

Each of dependent claims 2, 3, 6-8, 10-12, 51-60, 64 and 73-77 depends directly or indirectly on one of claims 1, 5, 48 and 71 and, therefore, should also be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

IV.   Claims 4 and 50 Should Be Allowable

In the Office action, the Examiner rejects claims 4 and 50 under 35 U.S.C. § 103(a) as being unpatentable over the Puri patent in view of U.S. Patent No. 5,734,783 to Shimoda et al. ("Shimoda patent"). The Applicants respectfully disagree.

Claim 4 depends on claim 1, and claim 50 depends on claim 48. The Puri patent and the Shimoda patent, taken separately or in combination, fail to teach or suggest the above-cited language of claims 1 and 48, respectively. As explained in section III, the Puri patent fails to teach or suggest the above-cited language of claims 1 and 48, respectively. The Shimoda patent fails to remedy this deficiency of the rejections. Although the Shimoda patent describes variable length coding and decoding as part of video coding/decoding system, it does not address variable length coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting the joint coding or corresponding decoding recited in claims 1 and 48, respectively.

For at least this reason, claims 4 and 50 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

V.   Claim 9 Should Be Allowable

In the Office action, the Examiner rejects claim 9 under 35 U.S.C. § 103(a) as being unpatentable over the Puri patent in view of U.S. Patent No. 5,650,829 to Sugimoto et al. ("Sugimoto patent"). The Applicants respectfully disagree.

Claim 9 depends on claim 1. The Puri patent and the Sugimoto patent, taken separately or in combination, fail to teach or suggest the above-cited language of claim 1. As explained in section III, the Puri patent fails to teach or suggest the above-cited language of claim 1. The

Sugimoto patent fails to remedy this deficiency of the rejection. Although the Sugimoto patent describes motion vector detection and compression, with an emphasis on different ways of performing motion vector detection, it does not detail coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting the joint coding language recited in claim 1.

For at least this reason, claim 9 should be allowable. The Applicants will not belabor the merits of the separate patentability of this dependent claim.

VI.   Claims 49 and 72 Should Be Allowable

In the Office action, the Examiner rejects claims 49 and 72 under 35 U.S.C. § 103(a) as being unpatentable over the Puri patent in view of U.S. Patent Application Publication No. 2002/0106025 to Tsukagoshi et al. ("Tsukagoshi publication"). The Applicants respectfully disagree.

Claim 49 depends on claim 48, and claim 72 depends on claim 71. The Puri patent and the Tsukagoshi publication, taken separately or in combination, fail to teach or suggest the above-cited language of claims 48 and 71, respectively. As explained in section III, the Puri patent fails to teach or suggest the above-cited language of claims 48 and 71, respectively. The Tsukagoshi publication fails to remedy this deficiency of the rejections. Although the Tsukagoshi publication describes aspects of a video decoding system, it does not address variable length coding and decoding of motion vector information or other motion information, and it is even further from teaching or suggesting decoding of a code that reflects joint encoding as recited in claims 48 and 71, respectively.

For at least this reason, claims 49 and 72 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

VII.   Claims 65 and 66 Should Be Allowable

In the Office action, the Examiner rejects claims 65 and 66 under 35 U.S.C. § 103(a) as being unpatentable over the Puri patent in view of features "well-known in the art" according to the Examiner. The Applicants respectfully disagree.

As a threshold matter, the Applicants respectfully disagree with the Examiner's use of Official Notice in the rejections. In any case, each of claims 65 and 66 depends on claim 48. As

explained in section III, the Puri patent fails to teach or suggest the above-cited language of claim 48. The features that the Examiner cites as being well-known in the art do not relate to variable length coding and decoding of motion information, and they are even further from teaching or suggesting decoding of a code that reflects joint encoding as recited in claim 48.

For at least this reason, claims 65 and 66 should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

VIII.   Conclusion

All pending claims should be allowable. Such action is respectfully requested. If any issues remain, the Applicants invite the Examiner to telephone the undersigned attorney at the number given below.

Respectfully submitted,

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